"THE EFFECTIVENESS OF COMBINED HIP AND KNEE MANUAL THERAPY VERSUS KNEE MANUAL THERAPY IN RELIEVING PAIN AND FUNCTIONAL ABILITY IN PATIENTS WITH PATELLO FEMORAL PAIN"

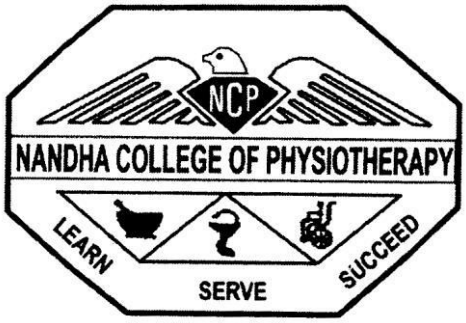
A Dissertation Submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY
CHENNAI

In partial fulfilment of the requirements
for the award of the

MASTER OF PHYSIOTHERAPY DEGREE
(ADVANCED PHYSIOTHERAPY IN ORTHOPAEDICS)
Submitted by

Reg. No. 271410063



NANDHA COLLEGE OF PHYSIOTHERAPY
ERODE – 638 052

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Submitted by

REGISTER NUMBER: 271410063

Under the guidance of

Prof. V.MANIVANNAN MPT (Ortho)

A Dissertation Submitted to

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

CHENNAI

Dissertation evaluated on**.....**

Internal Examiner External Examiner

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I wish her a great success in her dissertation work.

Place : Erode Principal Signature
Date :

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Place : Erode Guide Signature

Date :

DECLARATION

I hereby and present my project work entitled **"THE EFFECTIVENESS OF COMBINED HIP AND KNEE MANUAL THERAPY VERSUS KNEE MANUAL THERAPY IN RELIEVING PAIN AND FUNCTIONAL ABILITY IN PATIENTS WITH PATELLO FEMORAL PAIN."** is outcome of original research work was undertaken and carried out by me under the guidance of **Prof. V.MANIVANNAN, M.P.T, (Ortho).,**

To the best of my knowledge this dissertation has not been formed in any other basic for the award of any other degree, diploma, associate ship, fellowship, preciously from any other medical university.

Reg.No. 271410063

ACKNOWLEDGEMENT

It is first honourable duty to **"THANK THE ALMIGHTY GOD**" without whose guidance & blessing which showered on me to complete the project.

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At last and most extreme gratitude to my **Beloved Friends** for their valuable co-operation to complete this project.

PREFACE

It was immense pleasure for me to present this project work on **"THE EFFECTIVENESS OF COMBINED HIP AND KNEE MANUAL THERAPY VESRSUS KNEE MANUAL THERAPY IN RELIEVING PAIN AND IMPROVING FUNCTIONAL ABILITY IN PATIENTS WITH PATELLOFEMORAL PAIN"** because this opportunity made me learn a lot about this condition.

I have done this work with my best level by referring many Orthopaedics books, journals and websites. I have assessed and given treatment to patient to improve their condition. I believe this project work will prove to be very useful for the physiotherapists to give a better knowledge while assessing and treating patients with patellofemoral pain.

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INTRODUCTION

Patellofemoral pain can be defined as anterior knee pain involving the patella and retinaculum that excludes other intra-articular and peripatellar pathology. Patellofemoral pain syndrome is a broad term used to describe pain in the front of the knee and around the patella, or kneecap. It is sometimes called "runner's knee" or "jumper's knee" because it is common in people who participate in sports—particularly females and young adults—but patellofemoral pain syndrome can occur in non -athletes, as well. It is characterized by pain or discomfort seemingly originating from the contact of the posterior surface of the patella with the femur. The pain and stiffness it causes can make it difficult to climb stairs, kneel down, and perform other everyday activities.

It is the most common diagnosis in outpatients presenting with knee pain, affecting an estimated 7% to 40% of adolescents and active young adults.11% of office setting are caused by anterior knee pain. Wilson showed that females(62% of cases)are significantly more at risk of experiencing patellofemoral pain than men(38%of cases).It has been suggested that anatomic , hormonal and neuromuscular factors contribute to the greater risk, with the anatomic factor being the most widely discussed. Females with patellofemoral pain descend stairs with the knee in a more flexed position

and have the hip in a more adducted and internally rotated position at foot contact during stair stepping at a comfortable speed.

The patella articulates with the patellofemoral groove in the femur. Several forces act on the patella to provide stability and to keep it tracking properly. Patellofemoral pain syndrome can also be caused by abnormal tracking of the kneecap in the trochlear groove. In this condition, the patella is pushed out to one side of the groove when the knee is bent. This abnormality may cause increased pressure between the back of the patella and the trochlea, irritating soft tissues.

Factors that contribute to poor tracking of the kneecap include:

Problems with the alignment of the legs between the hips and the ankles. Problems in alignment may result in a kneecap that shifts too far toward the outside or inside of the leg, or one that rides too high in the trochlear groove—a condition called patella alta.

Muscular imbalances or weaknesses, especially in the quadriceps muscles at the front of the thigh. When the knee bends and straightens, the quadriceps muscles and quadriceps tendon help to keep the kneecap within the trochlear groove. Weak or imbalanced quadriceps can cause poor tracking of the kneecap within the groove.

Biomechanical, muscular and overuse theories have been proposed to explain the etiology of patellofemoral pain syndrome. In general, the literature and clinical experience suggest that that the etiology of the patellofemoral pain is multifactorial.

- Patellar misalignment
- Increased Q-angle
- Decreased flexibility of lower extremity
- Overuse
- Muscle imbalance
- Quadriceps weakness

All these factors resulting in an increased cartilage and subchondral bone stress. It has been proposed that abnormal neuro muscular factors alter patellar tracking and contribute to increased patellofemoral joint contacts pressures that ultimately lead to pain and dysfunction.

Patient often complains of pain over the front of the knee or 'underneath the knee cap'. The symptoms are usually of gradual onset although some case are caused by trauma and may be bilateral. Common symptoms include stiffness or pain, or both, on prolonged sitting with the knees flexed (sometimes called the 'theater sign'), and pain with activities that load the patellofemoral joint, such as climbing or descending stairs, squatting or running.

The pain can be difficult for the patient to localize. If asked to point to the location of pain, patients may place their hands over the anterior aspect of the knee or draw a circle with their fingers around the patella (the 'circle sign'). The pain usually described as' achy 'but it can be sharp at times. This usually does not represent true patellar instability but rather transient inhibition of the quadriceps because pain or deconditioning.

THE NEED FOR STUDY

Patellofemoral pain is the common diagnosis of the patients presenting with knee pain. Affecting mainly adolescents and young adults. Manual therapy interventions directed at regions proximal to the patellofemoral joint have been found to decrease anterior knee pain. Though various treatments are available, with the focus on the better treatments are available with the focus on the better treatment , I would like to find out the effectiveness of combined hip and knee manual therapy in relieving pain and improving functional ability in patients with patellofemoral pain.

AIM OF THE STUDY

- To find the effectiveness of knee manual therapy in relieving pain and functional ability in patients with patella femoral pain.
- To find out the effectiveness of combined hip and knee manual therapy in relieving pain and improving functional ability in patients with patellofemoral pain.
- To compare the effectiveness of hip and knee manual therapy when compared with knee manual therapy alone in relieving pain and improving functional ability in patients with patellofemoral pain.

OBJECTIVES OF THE STUDY

- To have in- depth knowledge on manual therapy in reducing patellofemoral pain.
- To quantify the pain reduction
- To improve the functional status
- To strengthen the muscles around hip and knee
- To improve weight bearing activities
- To improve gait

.

STATEMENT OF THE PROBLEM

To find out the effectiveness of combined hip and knee manual therapy versus knee manual therapy in relieving pain and improving functional ability in patients with patellofemoral pain.

OPERATIONAL DEFINITION

PATELLOFEMORAL PAIN

Patellofemoral pain is pain in the front of the knee. It frequently occurs in teenagers, manual labourers, and athletes. Patellofemoral pain may be caused by overuse, injury, excess weight, a kneecap that is not properly aligned (patellar tracking disorder), or changes under the kneecap. The main symptom of patellofemoral pain is knee pain, especially when you are sitting with bent knees, squatting, jumping, or using the stairs.

---Carolyn M. Hettrich

MANIPULATION/ MOBILIZATION:

Passive skilled manual therapy technique applied to joint and related soft tissue at varying speeds and amplitude using physiological or accessory motion for therapeutic purpose

- **Carolyn Kisner**

ASSUMPTION

The study has been conducted assuming that combined hip and knee manual therapy will improve the pain and functional ability than knee manual therapy alone in patients with patellofemoral pain.

PROJECTED OUTCOME

Based on review of literature the outcome of my study will be that combined hip and knee manual therapy will improve the pain and functional ability in patients with patellofemoral pain.

HYPOTHESIS

NULL HYPOTHESIS

It makes the research to be performed with in the premises of null hypothesis which stated as follows:

There is no significant difference between the effectiveness of combined hip and knee manual therapy versus knee manual therapy in relieving pain and improving functional ability in patients with patellofemoral pain.

ALTERNATIVE HYPOTHESIS

Experimental hypothesis for this study can be stated as follows:

There is significant difference difference between the effectiveness of combined hip and knee manual therapy versus knee manual therapy in relieving pain and improving functional ability in patients with patellofemoral pa

RIVIEW OF LITERATURE

A study of relevant literature is an essential step to get of full picture of what has been done with regard to the study undertaken. It helps to get a clear idea and support the findings with regards to the problem understudy.

- **Putra et al.,(2014)** performed a thesis about the combination of hip-quadriceps strengthening exercise to reduce pain in patellofemoral pain syndrome and the results showed that the hip-quadriceps strengthening exercise gives better result in reducing pain perception in patellofemoral pain syndrome (PFPS) patients compared with hip-strengthening exercise or quadriceps –strengthening exercise.

- **Catherine.,(2014)** was done this study to find out the effectiveness of the outcome of hip exercise in patellofemoral pain. And the results shows that hip and knee strengthening programmes were shown to be effective for patients with patellofemoral pain.

- **Senthil et al.,(2013)** in his study he concluded that combined lumbopelvic , hip and knee manual therapy is more effective than knee manual therapy alone in reducing pain and improving functional ability in patients with patellofemoral pain.

- **Jeroen et al.,(2011)** The aim of this systematic review was to investigate the effectiveness of proximal exercises, compared with knee exercises, for patients with patellofemoral pain, in improving pain and function. And the results shows that proximal interventions provide relief of pain and improved function in the short and long term treatment programmes.

- **Roy et al., (2011)**Their study foun that Kujala scale is a reliable and valid instrument for assessing the patellofemoral pain associated functional disturbances among the patient cohort.

- **Kirsty McKenzie et al.,(2010)** assessed the Lower Extremity Kinematics of Females With Patellofemoral Pain Syndrome While Stair Stepping and found out that women with PFPS tend to descend stairs with the hip in a more adducted and internally rotated position compared to age-matched controls. Analyses of the hip position at foot contact on the
  step showed similar results. Knee flexion at foot contact was greater in the participants with PFPS when compared to controls at a comfortable pace of stair stepping but not at a taxing speed.

- **Erik et el.,(2010)** his study shows the results that There is a link between the strength and position of the hip and PFPS. Hip strengthening and a coordination program may be useful in a conservative treatment plan for PFPS.

- **Michael S Crowell et al., (2010)** Their study showed that statistically significant differences were found in hip extension and abduction strength and hip internal rotation symmetry post-manipulation , but do not appear to be clinically meaningful.

- **Thiago Yukio Fukuda et al (2010)** Their study found that rehabilitation programs focusing on knee strengthening exercises and knee strengthening exercises supplemented by hip strengthening exercises were both effective in improving function and reducing pain in sedentary.

- **Prins et al.,(2009)** evaluated the patellofemoral pain in females and concluded that there is a decrease in abduction, external rotation and extension strength of the affected side compared with healthy controls.

- **Lowry et al.,(2008)** report a case series on the Management of patients with patellofemoral pain syndrome using a multimodal approach. Out of total 5 patients, 4 patients demonstrated decreased pain and a clinically significant improvement in function.

- **Gregory R Waryasz et al(2008)**Their study concluded that to reduce the likelihood of developing PFPS, any individual, especially those with positive potential risk factors, can perform the proposed prehabilitation program.

- **Arendt (2007)** carried out a research on the risk of females in musculoskeletal injuries of knee and shown that there is a higher incidence of patellofemoral disorders in females versus males.

- **Cibulka et al.,(2005)** described the evaluation of a patient with asymmetrical hip rotation and patellofemoral pain and outcomes suggest that femoral or hip joint asymmetry may be related to patellofemoral joint pain.
- **Timothy et al.,(2005)** conducted a study on the topic the Role of hip muscle function in the treatment of Patellofemoral Pain Syndrome and the results shows that improvements in hip flexion strength combined with increased iliotibial band and iliopsoas flexibility were associated with excellent results in patients with patellofemoral pain syndrome.

- **Cowan et al.,(2002)** investigated the effect of physical therapy treatment on the timing of electromyographic (EMG) activity of the vasti in individuals with patellofemoral pain syndrome and demonstrated that the "McConnell"-based physical therapy treatment regime for PFPS alters the motor control of VMO relative to VL in a functional task and this is associated with a positive clinical outcome.

- **Yerys S et al.,(2002)** carried out a study on the topic Effect of Mobilization of the Anterior Hip Capsule on Gluteus Maximus Strength. The purpose of this study was to determine the usefulness of posteroanterior (P-A) hip-joint mobilization in improving strength of the gluteus maximus muscle. He demonstrated that a significant increase in gluteus maximus strength in response to Grade IV P-A mobilizations
  performed on the anterior hip capsule.

- **Urho M. Kujala et al., (2002)** Their study reported significantly more symptoms according to Kujala score and more knee pain after squatting on patients with jumper's knee**.** It causes mild but long-lasting symptoms after an athletic career.

- **Crossley et al.,(2001)**Their study concluded that physiotherapy interventions in treating patellofemoral pain syndrome had significant beneficial effects.There appears to be a consistent improvement in short-term pain and function due to physiotherapy treatment.

- **Sutur et al.,(1992)** conducted a descriptive study about the decrease in quadriceps inhibition after sacroiliac joint manipulation in patients with anterior knee pain .Patients showed substantial muscle inhibition in the involved and the contralateral legs as estimated by the interpolated twitch technique. After the manipulation, a decrease in muscle inhibition and increases in knee extensor torques and muscle activation were observed, particularly in the involved leg. In patients with bilateral anterior knee pain, muscle inhibition was decreased in both legs after sacroiliac joint adjustment.

MATERIALS AND METHODOLOGY

MATERIALS

The following equipments were used in the study in which combined hip and knee manual therapy given for patients with patellofemoral pain;

- Visual Analogue Scale
- Kujala Anterior Knee Pain Scale
- Mulligan mobilization belt
- Desk/table of standard height.
- Pillow

METHODOLOGY

POPULATION: Females with age group of 18-50 years having patellofemoral pain

STUDY DESIGN:

- Pre and post experimental design.

STUDY SETTING: Study was done at,

- Out Patient Department Nandha College of Physiotherapy -Erode.
- Government Head Quarters Hospital -Erode.
- LKM Hospital Erode
- SIMS Hospital Erode

SAMPLING SIZE: A total of 30 female patients having patellofemoral pain

- Group A – 15 subjects
- Group B – 15 subjects

SAMPLING TECHNIQUE: Simple random sampling technique

STUDY DURATION: 30 minutes therapy (including intervals) session twice in a day, 5 days in week for the duration of four weeks.

CRITERIA FOR SAMPLE SELECTION

INCLUSION CRITERIA

- Female subjects with a history of patellofemoral pain.
- Individuals between 18 to 50 years of age with patellofemoral pain.
- Individuals with a complaint of anterior peripatellar or retropatellar knee pain that was provoked by two or more of the following: Squatting, stair ascent, stair descent, prolonged sitting, and kneeling or isometric quadriceps contraction.
- Insidious or gradual onset of symptoms unrelated to a traumatic incident.

EXCLUSION CRITERIA

- Osteoarthritis
- Knee ligament or meniscal injuries
- Patellar subluxation/dislocation
- Osgood –schlatter's syndrome
- Prior surgery on the spine or symptomatic knee
- Osteoporosis
- Compression fracture
- Signs of nerve root compression
- History of systemic connective tissue or neurologic disorder

PARAMETERS

- **VAS**

A Visual Analogue Scale (VAS) is a measurement instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. It is numerical rating scle that allows the patient to visually gauge the amount of pain along a solid 10 cm line , this is to measure pain. The patient himself is asked to mark on the 10 cm line where 0 is indicated as no pain and 10 severe pain.

- **Kujala Anterior Knee Pain Scale**

A new questionere was used to evaluate subjective symptoms and functional limitations in patellofemoral disorders.

OUTCOME MEASURES

- Pain
- Functional ability

TECHNIQUE AND APPLICATION

The subject who participated study is divided into two Groups. One is Group A and other one is Group B.

- Group A underwent hip and knee manipulation technique along with Conventional Therapy.
- Group B received knee manipulation technique along with Conventional Therapy.

PROCEDURE

Thirty female subjects with patellofemoral pain who fulfilled the inclusion and exclusion criteria were evaluated through standardized history and physical examination. They are randomly assigned to two different

groups, Group A and Group B. For both the groups, pain score and Kujala anterior knee pain score for patellofemoral pain were recorded before the treatment. Pretest values were recorded. Group A received a combined hip and knee manual therapy for four weeks. Group B received knee manual therapy alone for four weeks. Both the groups were advised to follow the common exercise protocol for patellofemoral pain. Pain score and Kujala anterior knee pain score for patellofemoral pain score were recorded as post-test values at the end of four weeks. Both the pre-test and post-test values were tabulated, statistically analyzed and compared.

MANIPULATION TECHNIQUES

GROUP A

- **Caudal hip non-thrust manipulation**: Participants were positioned in supine lying with hip and knee flexed to 90, with a belt placed just distal to the hip joint. Graded oscillatory manual force was then applied inferiorly by the therapist to impact a distraction force through the hip joint.
- **Proximal tibio-fibular non-thrust manipulation**: Participants were positioned in supine lying with hip and knee flexed to 90 degrees. The therapist should provide counterforce posterior to the fibular head as the knee was flexed towards 120 degrees.
- **Inferior and superior patellar non-thrust manipulations**: Participants were positioned in supine or long sitting with the painful knee placed in 15 degrees of flexion and patella cupped by examiners hand. A superior, inferior, medial and lateral force is then applied until the restrictive barrier is achieved.

GROUP B

- **Proximal tibio –fibular non-thrust manipulation.**
- **Inferior and superior patellar non-thrust manipulations.**

COMMON EXERCISE PROTOCOL FOR BOTH GROUP

Side- lying leg lift: participants were instructed lie on the normal side and tighten the front thigh muscles on the top leg. Top leg should be lifted 8 to 10 inches away from the other leg. The leg should be kept straight and lowered slowly. Three sets of ten repetitions should be done.

Step-up: participants were instructed to stand with the foot of affected leg on a support like a small step of block of wood 3 to 5 inches high. The other foot should be kept flat on the floor. The weight should be shifted onto affected leg on the support. The knee should be straightened as the other leg comes off the floor. The leg should be lowered back to the floor slowly. Three sets of ten repetitions should be done.

Wall squat: participants were instructed to stand with back, shoulders and head against a wall with by looking straight head. The shoulder should be kept relaxed and feet should be kept 2 feet away from the wall and a shoulder width apart. The back should be kept upright slowly squatting down to a 45 degree angle. This position should be held for 10 seconds and then slowly side back up the wall. Three sets of ten repetitions should be done.

Standing hamstring stretch: participants were instructed to place the heel of affected leg on a stool above 15 inches high. The knee should be kept straight. By leaning forward the hips should be bent until a mild stretch is felt in the back of the thigh. The stretch should be held for 15 to 30 seconds and repeated 3 times.

Iliotibial band stretch: Side-bending: Participants were instructed to cross one leg in front of the other leg and lean in the opposite direction from the front leg. The arm on the side of the back should be reached over the head while doing this. The position should be held for 15 to 30 seconds and repeated 3 times by switching the legs.

DATA PRESENTATION AND ANALYSIS

STATISTICAL METHOD

The collected data were tabulated and analyzed by using descriptive and interferential statistics. The data was analyzed by paired t- test. The statistical package for social sciences (SPSS) package was used to calculate and analyze the above mentioned descriptive and interferential statistics.

STATISTICAL TOOLS

For the pre and post test experimental study, both paired and unpaired 't' test was used for each parameter in an intra group analysis to find out the significance of improvement achieved through intervention. Then unpaired 't' test was used to find out the significance of the changes between two groups i.e., inter-inter group analysis.

PAIRED 't'-TEST

To compare the effect between two groups students 't' test for paired values.

Formula for paired t-test

$$S = \frac{\Sigma d^2 - \frac{(\Sigma d)^2}{n}}{n-1}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

d = difference between the pre test and post test

$\bar{d}$ = Mean difference

n = Total number of subjects

S = Standard deviation

UNPAIRED t- TEST

The unpaired t-test was used to compare the effects between two groups, students 't' test for unpaired values

Formula unpaired t –test

$$S = \sqrt{\frac{(n_1-1){s_1}^2+(n_2-1){s_2}^2}{n_1+n_2-2}}$$

$$t = \frac{|\bar{x}_1-\bar{x}_2|}{s\sqrt{\frac{1}{n_1}+\frac{1}{n2}}}$$

n_1 = Total number of subjects in GROUP A

n_2 = Total number of subjects in GROUP B

$\overline{X_1}$ = Mean difference between pre test and post test of GROUP A.

$\bar{X}_2$ = Mean difference between pre test and post test of GROUP B .

S_1 = Difference between pre test and post test of GROUP A .

S_2 = Difference between pre test and post test of GROUP B

TABLE 4.1

MEAN DIFFERENCE VALUE OF GROUP A GROUP B. (VAS SCALE & KUJALA ANTERIOR KNEE PAIN SCALE)

GROUPS	MEAN DIFFERENCE	
	VAS	KUJALA
EXPERIMENTALL GROUP	4.53	38.2
GROUP B	2.9	25.5

FIGURE 4.1

GRAPHICAL REPRESENTATION OF MEAN DIFFERENCE VALUE OF GROUP A AND GROUP B. (VAS SCALE & KUJALA ANTERIOR KNEE PAIN SCALE)

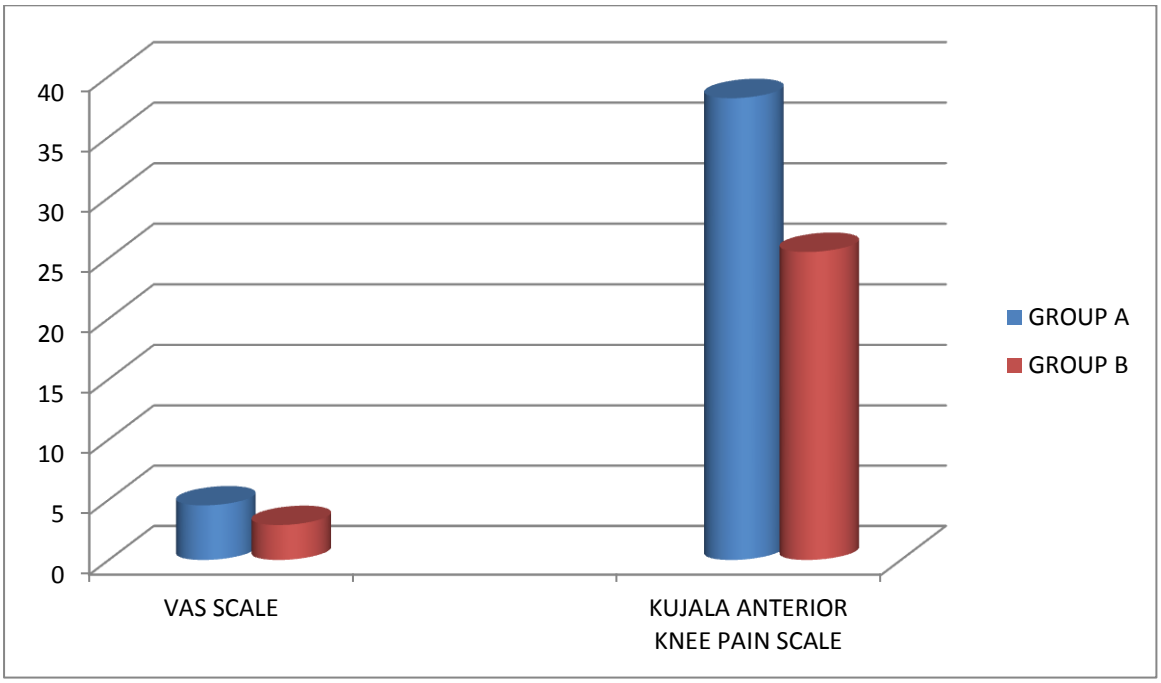


TABLE4. 2

STANDARD DEVIATION VALUES OF GROUP A AND GROUP B . (VAS SCALE & KUJALA ANTERIOR KNEE PAIN SCALE)

GROUPS	STANDARD DEVIATION	
	VAS	KUJALA
GROUP A	1.06	5.64
GROUP B	0.70	5.16

FIGURE4. 2

GRAPHICAL REPRESENTATION OF COMPARISON OF STANDARD DEVIATION VALUES OF GROUP A AND GROUP B. (VAS SCALE & KUJALA ANTERIOR KNEE PAIN SCALE)

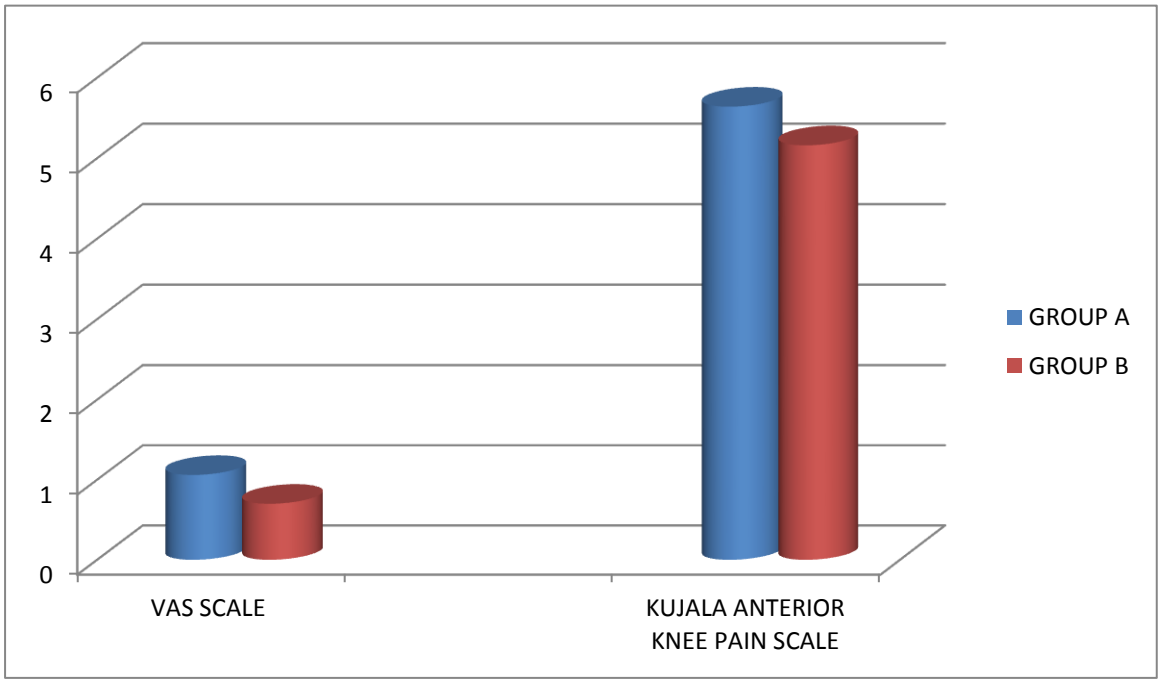


TABLE4. 3

PAIRED ‘t’ TEST VALUE OF GROUP A AND GROUP B. (VAS SCALE & KUJALA ANTERIOR KNEE PAIN SCALE)

GROUPS	CALCULATED PAIRED ‘t’ VALUES		TABLE VALUE	SIGNIFICANCE
	VAS	KUJALA		
GROUP A	16.13	28	2.15	SIGNIFICANT
GROUP B	15.74	17.18	2.15	SIGNIFICANT

FIGURE 4.3

GRAPHICAL REPRESENTATION OF PAIRED ‘t’ TEST VALUES OF GROUP A AND GROUP B. (VAS SCALE & KUJALA ANTERIOR KNEE PAIN SCALE)

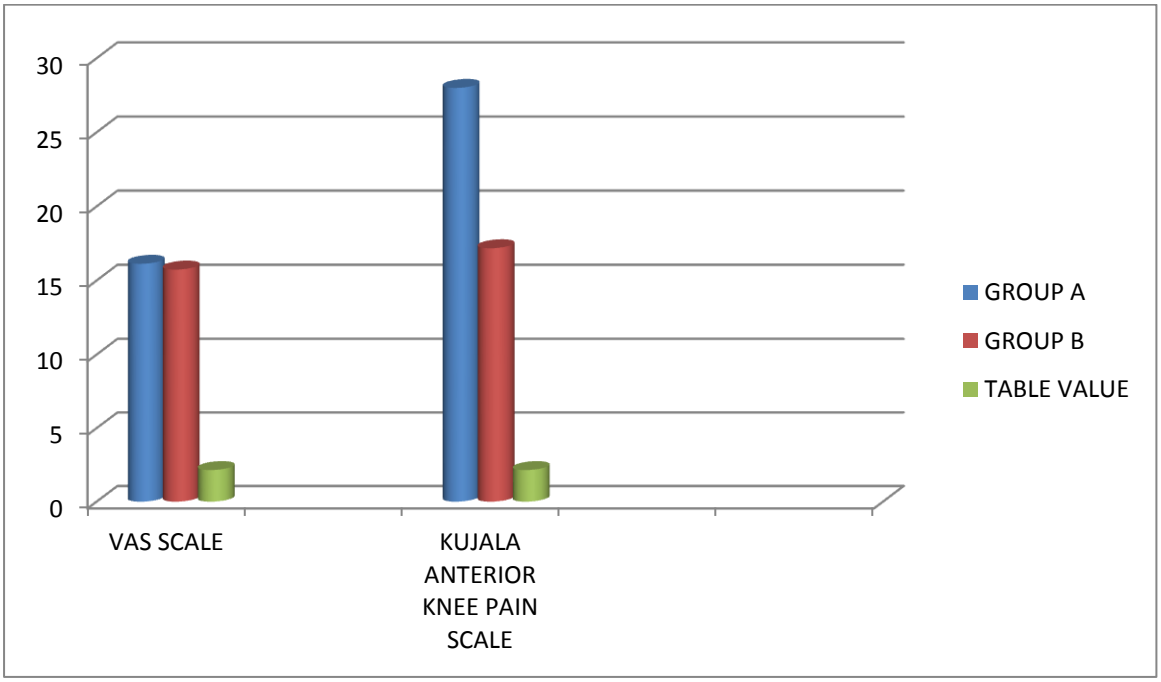


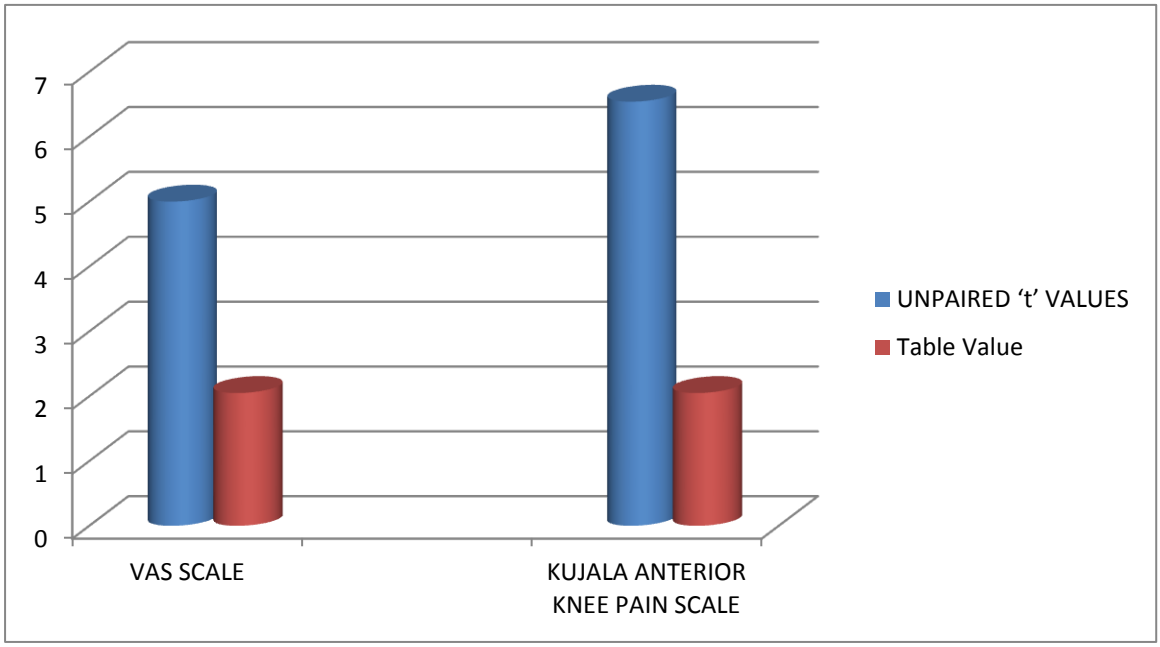
TABLE 4.4

UNPAIRED ‘t’ TEST VALUE OF GROUP A AND GROUP B. (VAS SCALE & KUJALA ANTERIOR KNEE PAIN SCALE)

GROUPS		CALCULATED UNPAIRED ‘t’ VALUES	TABLE VALUE	SIGNIFICANCE
COMPARISON OF GROUP A AND GROUP B	VAS	5	2.05	SIGNIFICANT
	KUJALA	6.54	2.05	SIGNIFICANT

FIGURE 4.4

GRAPHICAL REPRESENTATION OF UNPAIRED ‘t’ TEST VALUE OF GROUP A AND GROUP B.



RESULTS

The mean difference and standard deviation for pain score and functional ability score between pre and post treatment for Group A are recorded . Analysis of the data showed that there is significant reduction in pain score (VAS) and improvement functional ability score(KUJALA ANTERIOR KNEE PAIN SCALE) pre and post treatment programs.

The mean difference and standard deviation for pain score between pre and post treatment for Group B are recorded . Analysis of the data showed that there is reduction in pain score and improvement in functional ability.

The comparison of significance of reduction in the pain score and functional ability score between pre and post treatment programs for Group A and pre and post treatment programs for Group B was done with paired‘t’ test values.

Unpaired t-test for the pain scores and disability between post test values of Group A and Group B indicating there is high significance of pain reduction in Group A than Group B, and for the disability scores between post test values of Group A and Group B for the disability scores indicating that high significance of disability reduction in Group A than Group B.

There is statistically significant reduction in pain and improvement in functional ability between pre and post treatment programs in Group A when compared with Group B.

DISCUSSION

The above study was undertaken to evaluate the efficacy of combined hip and manual therapy when compared with knee manual therapy alone for the treatment of patellofemoral pain and also to compare which of the treatment of patellofemoral pain and also to compare which of the treatments is better in terms of reducing pain and improving functional ability for patients with patellofemoral pain. The intervention was given for a period of four weeks. In both the groups, pain and functional ability were taken as the dependent variables to assess the improvement between the groups and within the group.

In this study, visual pain scale was used to measure pain in both the groups. The effect of both the treatment techniques on pain was positive i.e., they both were effective in relieving the patients pain with four weeks intervention. When the responses were compared the results showed statistically significant difference between the groups. Maximum reduction of pain was in Group A when compared with Group B .

In the present study, Kujala score for patellofemoral pain was used to assess functional ability since its validity and reliability is already established by **Kay M Crossley, Kim L Bennell ,et al** through the study, **"analysis of outcome measures for persons with patellofemoral pain: which are reliable and valid?"**. Analysis of Kujala score revealed that there is improvement of functional ability in both the groups with four weeks of intervention. There is statistically significant difference when compared between the two groups. There is significant improvement in GROUP A supporting the research hypothesis. More improvement in functional ability in this group is in accordance with the study, "**Evidence-Based Review of Manual Therapy Efficacy in Treatment of Musculoskeletal Pain**" done

by **Andrew V, Bokarius, Vladimir Bokarius**. They stated that manual therapy resulted in significant improvement in active knee flexion and step-climbing ability for anterior knee pain.

Hip non-thrust manipulation was suggested as a useful intervention in a case report,"**Patellofemoral pain and asymmetrical hip rotation**" given by **Cibulka MT, e.t al** which described decreased pain and improved functional outcome measures.

The result of the study showed that there is more significant difference in pain improvement of functional ability in Group A when compared with Group B. The implication of the findings of this study is addressing proximal impairment may be an important element in the successful treatment of patients with patellofemoral pain.

LIMITATIONS

- This study has been conducted on small sized sample only
- This study took shorter duration to complete
- This study limitations include only for female patients.

RECOMMENDATIONS

- A study may be extended with larger sample.
- A study may include with male patients.
- A study may include with athletes

SUMMARY AND CONCLUSION

From the result of the study, there is decrease in pain and improvement in functional ability when knee manual therapy along with exercises is followed in patients with patellofemoral pain.

There is more significant decrease in pain and improvement in functional ability when combined hip and knee manual therapy along with exercises are followed in patients with patellofemoral pain.

The result of the study concluded that combined hip and knee manual therapy is more effective than knee manual therapy alone in reducing pain and improving functional ability in patients with patellofemoral pain.

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APPENDIX-I

PHYSIOTHERAPY ASSESSMENT

Date of assessment:

Name :

Age :

Sex :

Occupation :

Chief Complaints :

Present Medical History:

Past Medical History:

Pain Assessment:

Onset :

Duration :

Type :

Character :

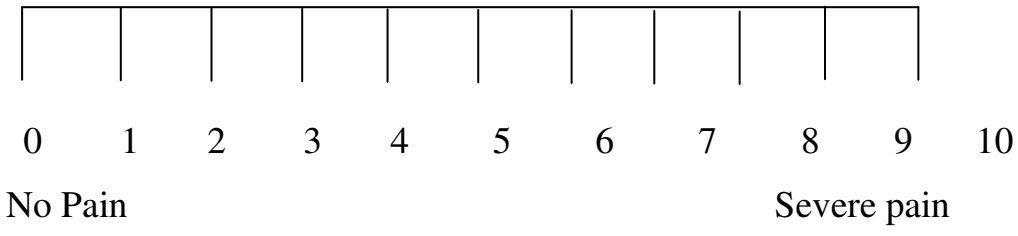
Aggravating factor :

Relieving factor :

Nature :

Intensity of pain :

VISUAL ANALOGUE SCALE



Vital signs:

Temperature :

Blood pressure :

Pulse Rate :

Respiratory Rate :

On Observation:

Built :

Posture :

Gate

Accessory movements:

On palpation:

Tenderness :

Warmth :

Oedema :

On Examination:

Superficial and deep sensation :

Superficial and deep reflexes :

Active and passive range of motion:

Differential diagnosis:

Special Test:

Diagnosis:

Physiotherapy Management:

Aims:

MEANS:

Course of Treatment

PROGNOSIS:

Outcome Measure:

Visual Analogue Scale:

APPENDIX-II

ETHICAL CLEARENCE

Ethically permission for the study will be obtained from the subjects and a written consent will be taken from each subjects who participate in the study. As this study involve human subjects the Ethical Clearance has been obtained from the Ethical committee of Nandha college of physiotherapy. Erode as per the ethical guidelines for Bio-medical research on human subjects. 2000 ICMR,(Indian Council of Medical Research)New Delhi

APPENDIX-III

ABSTRACT

INTRODUCTION

Patellofemoral pain syndrome is pain in the front of the knee. It frequently occurs in teenagers, manual laborers, and athletes. It is estimated that 7% to 40% of adolescents and active young adults. Manual therapy interventions directed at regions proximal to the patella femoral joint have been found to decrease anterior knee pain. Patellar non-thrust manipulation, hip non-thrust manipulations are examples of manual therapy interventions investigated in the patellofemoral pain population.

AIM

To compare the effectiveness of combined hip and knee manual therapy when combined with knee manual therapy alone in relieving pain and improving functional ability in patients with patellofemoral pain.

METHODOLOGY

Thirty female subjects with patellofemoral pain are randomly assigned to two different groups, GROUP A and GROUP B. For both the groups Pain score and Kujala anterior knee pain score for patellofemoral pain were recorded before the treatment. Pretest values were recorded. GROUP A received combined hip and knee manual therapy for four weeks. GROUP B received knee manual therapy for four weeks. Both the groups were advised to follow the common exercise protocol for patellofemoral pain. Pain score and Kujala anterior knee pain score for patellofemoral pain were recorded as posttest values at the end of four weeks. Both the pretest and posttest values are tabulate, statistically analyzed and compared.

RESULTS

There was statically significant reduction in pain and improvement in functional ability between pre and post treatment programs in Group A when compared with the Group B.

CONCLUSION

The results of the study concluded that combined hip and knee manual therapy is more effective than knee manual therapy alone in reducing pain and improving functional ability in patients with patellofemoral pain.

KEYWORDS

Patellofemoral pain, manual therapy, pain, functional ability and Kujala anterior knee pain scoring.

APPENDIX-IV

KUJALA ANTERIOR KNEE PAIN SCALE

Reference: Kujala UM, Jaakkola LH, Koskinen SK, Taimela S, Hurme M, Nelimarkka O: Scoring of patellofemoral disorders. Arthroscopy 1993, 9:159-163.

ANTERIOR KNEE PAIN (Sheet code: _____)

Name: _____ Date: _____

Age: _____

Knee: L/R

Duration of symptoms: _____ years _____ months

For each question, circle the latest choice (letter), which corresponds to your knee symptoms.

1. Limp

(a) None (5)

(b) Slight or periodical (3)

(c) Constant (0)

2. Support

(a) Full support without pain (5)

(b) Painful (3)

(c) Weight bearing impossible (0)

3. Walking

(a) Unlimited (5)

(b) More than 2 km (3)

(c) 1-2 km (2)

(d) Unable (0)

4. Stairs

(a) No difficulty (10)

(b) Slight pain when descending (8)

(c) Pain both when descending and ascending (5)

(d) Unable (0)

5. Squatting

(a) No difficulty (5)

(b) Repeated squatting painful (4)

(c) Painful each time (3)

(d) Possible with partial weight bearing (2)

(e) Unable (0)

6. Running

(a) No difficulty (10)

(b) Pain after more than 2 km (8)

(c) Slight pain from start (6)

(d) Severe pain (3)

(e) Unable (0)

7. Jumping

(a) No difficulty (10)

(b) Slight difficulty (7)

(c) Constant pain (2)

(d) Unable (0)

8. Prolonged sitting with the knees flexed

(a) No difficulty (10)

(b) Pain after exercise (8)

(c) Constant pain (6)

(d) Pain forces to extend knees temporarily (4)

(e) Unable (0)

9. Pain

(a) None (10)

(b) Slight and occasional (8)

(c) Interferes with sleep (6)

(d) Occasionally severe (3)

(e) Constant and severe (0)

10. Swelling

(a) None (10)

(b) After severe exertion (8)

(c) After daily activities (6)

(d) Every evening (4)

(e) Constant (0)

11. Abnormal painful kneecap (patellar) movements

(subluxations)

(a) None (10)

(b) Occasionally in sports activities (6)

(c) Occasionally in daily activities (4)

(d) At least one documented dislocation (2)

(e) More than two dislocations (0)

12. Atrophy of thigh

(a) None (5)

(b) Slight (3)

(c) Severe (0)

13. Flexion deficiency

(a) None (5)

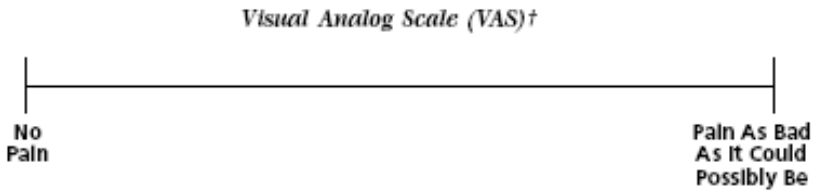
(b) Slight (3)

(c) Severe (0)

APPENDIX-V

VAS SCALE

A Visual Analogue Scale (VAS) is a measurement instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. It is numerical rating scale that allows the patient to visually gauge the amount of pain along a solid 10 cm line , this is to measure pain. The patient himself is asked to mark on the 10 cm line where 0 is indicated as no pain and 10 severe pain.



APPENDIX-VI

INFORMED CONSENT TO PARTICIPATE VOLUNTARILY IN A RESEARCH INVESTIGATION

NAME :

AGE :

SEX :

OCCUPATION :

ADDRESS FOR COMMUNICATION :

DECLARATION :

I have fully understood the nature and purpose of the study. I accept to be a subject in this study. I declare that the above information is true to my knowledge.

DATE :

PLACE : **Signature of the subject**

APEENDIX -VII

PRE AND POST TEST(VAS)OF GROUP A AND GROUP B

TABLE-1

S.NO	GROUP A	
	PRE TEST	POST TEST
1	7	3
2	7	2
3	6	1
4	8	2
5	6	2
6	7	1
7	8	2
8	7	2
9	6	2
10	6	2
11	8	3
12	7	5
13	7	3
14	6	2
15	7	3

TABLE-2

S. NO	GROUP B	
	PRE TEST	POST TEST
1	7	4
2	8	6
3	7	4
4	6	3
5	7	5
6	8	5
7	7	3
8	8	4
9	6	3
10	6	4
11	8	4
12	7	5
13	7	4
14	6	3
15	7	4

PRE AND POST TEST KUJALA ANTERIOR KNEE PAIN SCORING FOR GROUP A AND GROUP B

TABLE-4.3

S.NO	GROUP A	
	PRE TEST	POST TEST
1	30	70
2	20	65
3	22	62
4	35	60
5	30	65
6	20	59
7	30	70
8	30	72
9	25	64
10	30	65
11	25	58
12	28	68
13	30	65
14	32	70
15	15	60

TABLE-4.4

S.NO	GROUP B	
	PRE TEST	POST TEST
1	50	75
2	40	60
3	40	55
4	45	75
5	45	70
6	30	60
7	35	68
8	50	70
9	45	70
10	35	60
11	30	59
12	44	64
13	40	65
14	30	68
15	42	65